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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/955,810	09/19/2001	Yoshiyuki Tanaka	09792909-5188	1062

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EXAMINER

LEE, CALVIN

ART UNIT PAPER NUMBER

2825

DATE MAILED: 01/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/955,810	TANAKA ET AL.	
	Examiner	Art Unit	
	Lee Calvin	2825	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 May 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on __ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

FINAL ACTION

Response to Amendment

1. The addition of claims 6-8, dated 1/02/04, is acknowledged.

Claim Rejections - 35 U.S.C. § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-3 and 6 are rejected under 35 U.S.C. 102(e) as being anticipated by *Jang*.

Jang (6,180,540) teaches a method of forming an interlayer insulating film comprised of:

- forming an FSG (fluorine-doped silicate glass) layer **14** on a substrate **10** having wiring **12a**
- then forming a dielectric SiO layer **18** on FSG layer **14** in the same process chamber [cols. 6-8]
- planarizing the SiO layer by CMP [Fig. 4]

Jang suggests that the FSG layer is formed at 350 to 400°C [col. 6, lns.18-35] and the SiO layer is formed at 350 to 450°C [col. 9, lns.7-31]. In other words, the SiO layer is formed at a temperature that is 50°C higher, at least 10% higher, than the FSG layer formation temperature. Therefore, *Jang* implicitly teaches that the SiO layer is formed at a temperature (up to 450°C) at least 10% higher than the forming temperature (up to 400°C) of the FSG layer [col. 7, ln. 67].

Claim Rejections - 35 U.S.C. § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4-5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Rana et al* (US 6,191,026) in view of *Jang* (6,180,540) or *Abdelgadir et al* (US 6,274,933).

Rana et al discloses a method for producing a semiconductor device including formation of an interlayer insulating film having an FSG, comprising the steps of:

- forming an FSG layer **406** in a process chamber [Fig. 4A]
- then sputtering etchback a portion of the FSG layer in the same chamber [Fig. 3 and col. 9]
- forming an insulating layer of FSG on the FSG layer **406** [col. 9, ln. 53]
- planarizing the insulating layer by CMP [Fig. 4C and col. 9, ln. 63]

Rana et al suggests removing from the FSG its upper corners **408** but not the surface layer. *Jang* discloses removing a surface layer of an FSG layer **14** [Fig. 2, 4 and col. 6]. Moreover, *Abdegadir et al* teaches removing a surface layer of FSG layer **42** [Fig. 3 and col. 4].

It would have been obvious to one having ordinary skill in the art to have modified the FSG removal in of *Rana et al* by utilizing the step of reducing the top layer of an FSG. The motivation to do so would have been to decrease the potential of subsequent conductive lines being exposed to the underlying FSG layer [col. 5, ln.5 in *Abdegadir et al*].

Allowable Subject Matter

6. Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the cited arts teaches or suggests that the temperature during sputtering reaches a value higher than a temperature of forming the fluorine-doped silicon oxide layer.

Response to Arguments

7. Applicant's statement that "the necessity of removing the hydrated SiF layer by not applying a CMP process directly to the SiF layer" is acknowledged. As a result, *Rana et al* in the last office action obviates this invention feature (emphasis, sputtering etchback the FSG layer). *Jang* '540, on the other side, teaches the application of CMP to the FSG layer. Therefore, the sustained §102 rejections under *Jang* are proper since claims 4-5 and 7 are expressly anticipated. Please review the above rejections.

Applicant's argument that "the invention in *Rana et al* is directed to a totally different process and objective than applicants" is unpersuasive. Examiner notes that *Rana*'s teaching of an FSG removal by sputter etchback method is clearly applicable for producing a semiconductor device utilizing an interlayer insulating film of fluorine doped silicon oxide (so doe the pending application) to fill gaps between wiring and protect the wiring from defects.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

The new issue "the temperature during sputtering reaches a value higher than a temperature of forming the fluorine-doped silicon oxide layer" in the new claim 8 is novelty (see the Allowance Subject Matter). However, this action is made final because the same references are used.


8. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

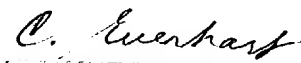
A shortened statutory period for reply to this final action is set to expire three months from the mailing date of this action. In the event a first reply is filed within two months of the mailing date of this final action and the advisory action is not mailed until after the end of the three-month shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than six months from the date of this final action.

Contact Information

9. Any inquiry concerning this communication from the Examiner should be directed to *Calvin Lee* at (571) 272-1896 from 7 to 17 ET (Monday through Thursday). If attempts to reach the examiner by telephone are unsuccessful, Art Unit 2825's Supervisory Patent Examiner *Matthew Smith* can be reached at (571) 272-1907.

Any inquiry relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0596. The fax phones are (703) 872-9318 for regular communications and (703) 872-9319 for After-Final communications.


January 22, 2004


C. Euerhart
GROUP RECEPTIONIST
PRIMARY EXAMINER